REQ. NO. 0-9154

INCO METALS COMPANY

Copper Cliff, Ontario P0M 1N0

Environmental Control
Department
Ontario Division

April 12, 1982.

CONTRACT REPORT NO. 0SQ81-00213

CANMET, Mining Research Laboratories,
555 Booth Street,
Ottawa, Ontario.
K1A 0G1

Attention: Mr. D. Dainty
Department of Energy, Mines and Resources

Re: DSS 03SQ-23440-0-9154

Dear Mr. Dainty:

As per our contractual agreement 03SQ-23440-0-9154, Inco Metals is submitting our report and invoice for work completed as of March 31, 1982.

The attached work sheets indicate all parameters monitored during 48 hours of operation. This data includes numerous parameters which were not initially requested, however, their measurement was essential.

Back pressures throughout the testing period remained relatively constant during various phases of the duty cycle. The attachments, document the engine operating hours, measured and noted conditions during operation.

The filter does serve as a substantial muffler (see attachment).

During initial operations, there was a distinct irritating yet unidentifiable odour from the units. This odour was not characteristic of diesel exhaust odours. Particulates were noticeably reduced during the test.

Unexpected, yet of interest was the fact that regeneration of the filter was not necessary during the initial 48 hours of testing. In fact, regeneration insitue occurred with elevated carbon monoxide being noted. Carbon monoxide increased during some phases of the testing from 100 ppm to 500 ppm. This phenomenon may be of some advantage pending the ability of mine ventilation to dilute the carbon monoxide to acceptable levels. In addition, it must be ascertained whether or not polynuclear aromatic hydrocarbon generation is effected during insitue decomposition of organic particulate matter.

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Due to the aforementioned phenomenon operating hours for filter maintenance is not available.

Physically the filter endured the 48 hour trial period.

Further testing will be carried out to evaluate durability, effectiveness and acceptability of the filters on a continuous operating basis.

Inco expects to submit a further report to you upon completion of additional testing.

We trust that this report fulfils our commitment to a very worthwhile project, which we will be completing at our cost.

Yours sincerely,

W T Elliott

WTE/jv

W. T. Elliott, P. Eng.,
Supervisor,
Environmental Control.

SURFACE TRIAL OF THE CORNING CERAMIC DIESEL EMISSIONS FILTER

March 24, 1982

Inco Scooptram # 199

North Mine scoop mucking rock pile.

Filter No.	Date	Time	Hour Meter Reading	Wind Speed & Surface Direction	Exh. Temperature °F Full Speed Full Load	Exh. Back Press Idle No Load	Exh. Back Press Full Speed Full Load	Inlet Clean Air Idle No Load	Inlet Clean Air Full Speed Full Load	Exh. Noise 60 Leq.dBA	Operator's Comments
L #1	03/24/82	9:45	13.4	140° @ 7.8 m/sec.	1017°	0	5	5	12	95	The meter started at 13.4 hours. Unidentified odour from ceramic filters.
R #2		#1		S-East		0	5				
L #1	"	11:28	14.5	160° @ 9.2 m/sec.	1023°	0	5	5	12	98	
R #2		#2		S.S. East	815 at Exh.	0	5				
L #1	"	3.05	18.2	180° @ 7.9 m/sec	1019°	0	5	5	12	105	
R #2		#3		South		0	5				

Filter No.	Time	General Atmosphere PPM CO	NO_2	NO_x	HCHO	CO_2	Exhaust PPM CO	NO_2	NO_x	HCHO	CO_2	Relative Humidity DB	WB	%	Operating Remarks
#1	9.45	20	Nil	Nil	Nil		200								Both banks ceramic filter only.
#2	1	20					200								
#1	11:28	10					125	1.0	600	Nil					
#2	2	10					100	1.0	-	Nil					
#1	3.05	10					100	Nil	500	Nil					
#2	3	10					100	Nil	300	Nil					

SURFACE TRIAL OF THE CORNING CERAMIC DIESEL EMISSIONS FILTER

March 25, 1982

Inco Scooptram # 199

199 Scoop mucking on surface at North Mine

Filter No.	Date	Time	Hour Meter Reading	Wind Speed & Surface Direction	Exh. Temperature °F Full Speed Full Load	Exh. Back Press Idle No Load	Exh. Back Press Full Speed Full Load	Inlet Clean Air Idle No Load	Inlet Clean Air Full Speed Full Load	Exh. Noise 60 Leq.dBA	Operator's Comments
L 1	03/25/82	9:40	19.7	230° @ 5.8 S-W	1019°	5		0	12		Unidentified odour
R 2		1		South		0				95	from ceramic filters.
L 1	"	11:20	21.4	240° @ 5.8 m/sec		3	15	0	12		
R 2		2		S-W		4	15				
L 1	"	3:00	25.0			3	17	0	12		
R 2		3				4	17			103	

Filter No.	Time	General Atmosphere PPM CO	NO_2	NO_x	HCHO	CO_2	Exhaust PPM CO	NO_2	NO_x	HCHO	CO_2	Relative Humidity DB	WB	%	Operating Remarks
L 1	1	10					100	Nil	250	Nil					Both banks ceramic filter only.
R 2		10					100	Nil	175	Nil					
	3	5					100	Nil	300	Nil					Both banks ceramic filter only.
		5					100	Nil	250	Nil					

SURFACE TRIAL OF THE CORNING CERAMIC DIESEL EMISSIONS FILTER

March 29, 1982

Inco Scooptram # 199

North Mine - Ceramic Exhaust Filter Test

Filter No.	Date	Time	Hour Meter Reading	Wind Speed & Surface Direction	Exh. Temperature OF Full Speed Full Load	Exh. Back Press		Inlet Clean Air		Exh. Noise	Operator's Comments
						Idle No Load	Full Speed Full Load	Idle No Load	Full Speed Full Load	60 Leq.dBA	
L#1	03/29/82	11.25	27.1	260° @ 5.2 m/sec	1017°	3	12	3	12	118	Unidentified odour
R#2		Test #1		west		5	15				from ceramic filters.
L#1		15:00	30.7	210° @ 3.9 m/sec	1058°	5	17	3	12	109	
R#2		Test #2		S.S.W.		5	17				

		General Atmosphere PPM					Exhaust PPM					Relative Humidity			Operating Remarks
		CO	NO_2	NO_x	HCHO	CO_2	CO	NO_2	NO_x	HCHO	CO_2	DB	WB	%	
L#1	Test #1	10					300	Nil	400	2	Over				Both banks ceramic filter only.
R#2		10					300	Nil	500	2	Limit				
L#1	Test #2	Nil					500	Nil	400	2	Over				
R#2		Nil					200	Nil	300	Nil	Limit				

SURFACE TRIAL OF THE CORNING CERAMIC DIESEL EMISSIONS FILTER

March 30, 1982

Inco Scooptram # 199

North Mine

Filter No.	Date	Time	Hour Meter Reading	Wind Speed & Surface Direction	Exh. Temperature °F Full Speed Full Load	Exh. Back Press Idle No Load	Exh. Back Press Full Speed Full Load	Inlet Clean Air Idle No Load	Inlet Clean Air Full Speed Full Load	Exh. Noise 60 Leq.dBA	Operator's Comments
L #1	03/30/82	11:20	34.6		1067°	3	12	3	12		Unidentified odour
R #2	Test #1					3	15				from ceramic filters.
	Test #2	15:00	37.5		1027°	3	15	3	12		
						3	20				

	General Atmosphere PPM					Exhaust PPM					Relative Humidity			Operating Remarks
	CO	NO_2	NO_x	HCHO	CO_2	CO	NO_2	NO_x	HCHO	CO_2	DB	WB	%	
Test #1	10					300	Nil	300	2.0					Both banks ceramic filter only.
	5					300	Nil	300	Nil					
L#1 Before	-					100	15	600+	20					
R#2 Filter	-					100	15	600+	20					
Test #2														
L#1 After	20					300	Nil	350	Trace					
R#2 Filter	10					300	Nil	400	Trace					

SURFACE TRIAL OF THE CORNING CERAMIC DIESEL EMISSIONS FILTER

March 31, 1982

Inco Scooptram # 199

North Mine

Filter No.	Date	Time	Hour Meter Reading	Wind Speed & Surface Direction	Exh. Temperature °F Full Speed Full Load	Exh. Back Press Idle No Load	Exh. Back Press Full Speed Full Load	Inlet Clean Air Idle No Load	Inlet Clean Air Full Speed Full Load	Exh. Noise 60 Leq.dBA	Operator's Comments
L #1	03/31/82	11:45	41.4	220° @ 12.3 m/sec	1110°	3	17	5	12		Unidentified odour
R #2		Test #1		S-West		3	17				from ceramic filters.
L #1		15:02	44.5	250° @ 9.7 m/sec	1113°	3	20	3	12		
R #2		Test #2		S-West		3	20				

	General Atmosphere PPM					Exhaust PPM					Relative Humidity			Operating Remarks
	CO	NO_2	NO_x	HCHO	CO_2	CO	NO_2	NO_x	HCHO	CO_2	DB	WB	%	
Exhaust before filter						100	10	600+	5	-				TEMP. 1110°F
Test #1						100	10	600+	2	_				
Exhaust after filter	Trace					200	Nil	500	Nil	-				1120° F
	Nil					400	Nil	500	Nil	-				Both banks ceramic filter only.
Exhaust before filter						100	10	600+	50	-				1113°F
Test #2						100	15	600+	50	-				
Exhaust after filter	Nil					100	Nil	300	Nil					1115°F
	Nil					100	Nil	250	Nil					

SURFACE TRIAL OF THE CORNING CERAMIC DIESEL EMISSIONS FILTER

April 5, 1982

Inco Scooptram # 199

Ceramic Test (North Mine)

Filter No.	Date	Time	Hour Meter Reading	Wind Speed & Surface Direction	Exh. Temperature °F Full Speed Full Load	Exh. Back Press Idle No Load	Exh. Back Press Full Speed Full Load	Inlet Clean Air Idle No Load	Inlet Clean Air Full Speed Full Load	Exh. Noise 60 Leq.dBA	Operator's Comments
L	04/05/82	11:30 AM	47.5	350° @ 4.0 m/sec.	1115	4	16	3	12	108	Odour no longer noticeable.
R		Test 1		N							
L		3:00 PM	49.2	350° @ 1.5 m/sec.	1047	3	17	3	12	98	
R		Test 2		N							

	General Atmosphere PPM					Exhaust PPM					Relative Humidity			Operating Remarks
	CO	NO_2	NO_x	HCHO	CO_2	CO	NO_2	NO_x	HCHO	CO_2	DB	WB	%	
L Test 1	-					400	Nil	500	Nil					Ceramic filter on left side
R	-					300	6	100	20					No filters on right side
L In exhaust after filter	10					500	Nil	100	2					
" " before filter						100	20	20	20					
Test 2 R	20					300	20	20	20					

SURFACE TRIAL OF THE CORNING CERAMIC DIESEL EMISSIONS FILTER

Inco Scooptram # 199

April 6, 1982
Ceramic Test (North Mine)

Filter No.	Date	Time	Hour Meter Reading	Wind Speed & Surface Direction	Exh. Temperature °F Full Speed Full Load	Exh. Back Press Idle No Load	Exh. Back Press Full Speed Full Load	Inlet Clean Air Idle No Load	Inlet Clean Air Full Speed Full Load	Exh. Noise 60 Leq.dBA	Operator's Comments
L	04/06/82	1:50 PM	53-1	360° & 9.2 m/sec N	1057°	3	16	5	12	89	
R						5	20				

	General Atmosphere PPM					Exhaust PPM					Relative Humidity			Operating Remarks
	CO	NO_2	NO_x	HCHO	CO_2	CO	NO_2	NO_x	HCHO	CO_2	DB	WB	%	
L	10					500	Nil	500	10					Left side ceramic filter.
R	Nil					55	15	200	10					Right side ceramic and PTX filters.

SURFACE TRIAL OF THE CORNING CERAMIC DIESEL EMISSIONS FILTER

Inco Scooptram # 199

April 8, 1982

Ceramic Test (North Mine)

Filter No.	Date	Time	Hour Meter Reading	Wind Speed & Surface Direction	Exh. Temperature °F Full Speed Full Load	Exh. Back Press Idle No Load	Exh. Back Press Full Speed Full Load	Inlet Clean Air Idle No Load	Inlet Clean Air Full Speed Full Load	Exh. Noise 60 Leq.dBA	Operator's Comments
L	04/08/82	10:00 AM	60.1	312° @ 4.6 m/sec	1157	0	22	5	12		
R				N. West		0	25				

	General Atmosphere PPM					Exhaust PPM					Relative Humidity			Operating Remarks
	CO	NO_2	NO_x	HCHO	CO_2	CO	NO_2	NO_x	HCHO	CO_2	DB	WB	%	
L	Nil					125	15	1000	20					Ceramic and PTX filters mounted on both sides
R	Nil					45	22	600	2					of the scooptram.